Jonathan Yancey

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Chemical Engineering, Bachelors of Science, May 2013
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"Development of Life Support Adsorption Technologies for Future Exploration Spacecraft"

The removal of CO_2 and humidity from manned spacecraft is critical to the success of long-term missions. High concentrations of CO_2 are hazardous to human crews, and high humidity levels yield condensation inside the spacecraft, damaging its critical systems. Currently utilized by the International Space Station, the Environmental Control and Life Support System (ECLSS), recycles CO_2 and H_2O using packed beds of adsorbent molecular sieves. Although these molecular sieves effectively adsorb CO_2 and H_2O, attrition over time produces a fine powder that escapes into the station. A temporary filter is being used to prevent damage to the Space Station, but future designs must address adsorbent degradation. This work tests adsorbent materials for resistance to attrition for future life support systems. Also, this work tests a new packed bed design that exploits the temperature swing of sorbent materials during adsorption and desorption.

Research and Experience

- **Marshall Space Flight Center**, Summer Intern, Summer 2012
  ECLSS: Sorbent Screening; IBD testing
- **WVU Shared Facilities,** Student Worker, Morgantown, West Virginia (February - December 2010)
  Cleanroom Maintenance; Equipment Training; Chemical Inventory and Safety
- **NASA WVSGC,** Undergraduate Fellowship, Morgantown, West Virginia (December 2010 - Present)
  Research: solid state battery; synthesize solid state components; electrolyte/electrode screening and enhancement

Memberships and Activities

AICHE
SPACE; Co-president
RASC-AL; Team Leader (2012)

Honors, Awards

Dean's List
Mountaineer Scholarship
WV Higher Education Science, Engineering, and Technology Scholarship
NASA Space Grant Scholar
NASA Space Grant Undergraduate Fellowship (2011, 2012)
WVNANO SURE Symposium Winner